CLAIMS

1. A method of generating X-ray or EUV radiation, comprising the steps of:

(i) urging a substance through an outlet to generate a jet in a direction from the outlet,

(ii) directing at least one energy beam onto the jet, the energy beam interacting with the jet to generate said X-ray or EUV radiation, and

(iii) controlling the temperature of said outlet, such that the stability of said jet is improved.

2. A method as set forth in claim 1, wherein said step of controlling the temperature comprises effecting ohmic heating of the outlet, preferably at an orifice thereof.

3. A method as set forth in claim 1, wherein said step of controlling the temperature comprises directing radiation energy onto said outlet.

4. A method as set forth in claim 1, wherein the jet leaves the outlet in a condensed state.

5. A method as set forth in claim 1, wherein the substance comprises a gas which is cooled to a liquid state before being urged through said outlet.

6. A method as set forth in claim 5, wherein the gas is an essentially inert gas, such as a noble gas.

7. A method as set forth in claim 1, wherein the energy beam is directed onto a spatially continuous portion of the jet.

8. A method as set forth in claim 1, wherein the energy beam is directed onto at least one droplet of the jet.

9. A method as set forth in claim 1, wherein the energy beam is directed onto a spray of droplets or clusters formed from the jet.

10. A method as set forth in claim 4, wherein the jet is cooled by evaporation to a frozen state, and the energy beam is directed onto a frozen portion of the jet.

11. A method as set forth in claim 1, wherein the energy beam comprises pulsed laser radiation which interacts with the jet to form a plasma emitting said X-ray or EUV radiation.

12. A method as set forth in claim 1, wherein said energy beam is focused on the jet to essentially match a transverse dimension of the energy beam to a transverse dimension of the jet.

13. A method as set forth in claim 7, wherein the energy beam is focused to essentially coincide with said spatially continuous portion over a length thereof.

14. An apparatus for generating X-ray or EUV radiation, comprising

an energy source arranged to emit at least one energy beam;

a target generator arranged to urge a substance through an outlet to generate a target in the form of a jet in a direction from the outlet; and

a beam controller operative to direct the energy beam emitted by the energy source onto the target jet generated by the target generator, said X-ray or EUV radiation being generated by the energy beam interacting with the jet,

the target generator further comprising a temperature controller operative to control the temperature of said outlet, such that the stability of said target jet is improved.

15. An apparatus as set forth in claim 14, wherein the temperature controller comprises a resistive element arranged in association with said outlet, and a power supply connected to the resistive element to heat the outlet by ohmic heating.

16. An apparatus as set forth in claim 14, wherein the temperature controller comprises a radiation heater directing radiation energy onto said outlet.

17. An apparatus as set forth in claim 16, wherein the outlet comprises means providing for enhanced and/or confined absorption of the radiation energy.

18. An apparatus as set forth in claim 14, wherein the target generator is adapted to generate the jet such that it is in a condensed state when leaving the outlet.

19. An apparatus as set forth in claim 14, wherein the substance comprises a gas, the target generator being adapted to cool said gas to a liquid state before urging it through the outlet.

20. An apparatus as set forth in claim 19, wherein the gas is an essentially inert gas, such as a noble gas.

21. An apparatus as set forth in claim 14, wherein the target generator is controllable to provide a spatially continuous portion, at least one droplet, or a spray of droplets or clusters for the energy beam to interact with.

22. An apparatus as set forth in claim 14, wherein the outlet is arranged to generate the jet in a chamber, and wherein a conditioning means is arranged to control the atmosphere in the chamber such that the jet is cooled by evaporation to a frozen state on entry into the chamber.

23. An apparatus as set forth in claim 14, wherein the energy source comprises a laser emitting at least one beam of pulsed laser radiation, said beam, when directed onto the jet, interacting therewith to form a plasma emitting said X-ray or EUV radiation.

24. An apparatus as set forth in claim 14, wherein the beam controller is adapted to focus said energy beam on the jet to essentially match a transverse dimension of the energy beam to a transverse dimension of the jet.

25. An apparatus as set forth in claim 21, wherein the beam controller is adapted to focus said energy beam

to essentially coincide with said spatially continuous portion over a length thereof.

26. A method as set forth in claim 1, wherein X-ray radiation is generated, further comprising the step of performing X-ray microscopy with said radiation.

27. A method as set forth in claim 1, further comprising the step of performing proximity lithography with the generated radiation.

28. A method as set forth in claim 1, wherein EUV radiation is generated, further comprising the step of performing EUV projection lithography with said radiation.

29. A method as set forth in claim 1, further comprising the step of performing photoelectron spectroscopy with the generated radiation.

30. A method as set forth in claim 1, wherein X-ray radiation is generated, further comprising the step of performing X-ray fluorescence with said radiation.

31. A method as set forth in claim 1, wherein X-ray radiation is generated, further comprising the step of performing X-ray diffraction with said radiation.

32. A method as set forth in claim 1, further comprising the step of performing a medical diagnosis with the generated radiation.